

Chapter IV

MANAGING THE DoD VE ORGANIZATION

Introduction

To be successful and attain its full potential, a management program requires close supervision by those responsible for achieving its objectives. This is particularly true of VE because of the critical need to allocate scarce VE resources to maximize the return on their use. This chapter discusses some of the considerations for a manager seeking to organize, operate, and measure a VE program in the DoD. Collectively they provide a method of directing VE efforts toward a maximum contribution to better value.

Developing a VE Policy

VE programs in industry and Government are usually intended to be a purposeful, **planned** approach to cost reduction, which make use of the best relevant tools of science, engineering, and industrial management. Establishment of such a program does not, of itself, assure an effective approach to cost reduction. A productive VE capability requires strong and active top management involvement. A powerful indication of this is an affirmative policy statement on VE issued by top management. Within the DoD, involvement is demonstrated by the policies contained in DoD Directive 4245.8, "DoD Value Engineering Program," May 7, 1984.

Each DoD Component subsequently issued a document implementing its program in accordance with the policy statement issued by the OSD. Although overall uniformity is desirable, nevertheless, each subordinate element tailored its policies to satisfy its needs and comply with its procedures. Generally these implementing Directives include requirements to:

- o Centralize policy direction and responsibility for assuring implementation of overall VE policies.
- o Establish VE goals for subordinate components.
- o Initiate procedures for periodic management review of progress and overall status.
- o Expedite the objective evaluation of VEPS and VECPS and related contract changes.
- o Ensure that **personnel** charged with various facets of the DoD VE program are adequately trained.
- o Provide adequate funding to operate and support VE activities.

A statement-of policy from top management does not guarantee a successful program. Management must demonstrate continuing personal involvement to emphasize the importance of the program and to encourage participation at all levels of the organization.

Nature of the VE Investment

A. Total Benefits

The intent of a VE effort is to minimize the total cost of a product or capability. VE is a means to help the line organization improve the value of the product. VE efforts have produced both dollar savings and nonmonetary benefits. Although the nonmonetary benefits resulting from VE cannot be precisely measured, nevertheless they are substantial. Further improvement in these characteristics benefit both the Government and the contractor. Thus, prior to determining the structure and magnitude of the VE investment, the nature of the overall benefits likely to accrue should first be considered.

B. Resources Needed

1. Dollars

The total investment in a VE program may be viewed from several aspects. One view is to consider that the investment in VE has three components. First are the "indirect" costs of planning and operating a VE program including such items as training, promotional materials, motivational exercises, etc. The second consists of the cost of generating and reviewing specific VE proposals. However, the success of the DoD VE program is measured by the savings from implemented VE actions. Therefore, the third cost component associated with a VE program is the cost to implement accepted VE proposals. The budget for a VE program must include the funds necessary for implementation to eliminate impediments such as "no money for test" or "no money available to purchase samples." For instance, the VE program may require more money for implementation and test costs than is required for the direct cost of the VE studies. On the other hand, resulting savings may total more than 10 to 20 times the cost of the studies. To take advantage of this potential yield, implementation funds have to be made available.

2. Personnel (Level of Effort)

In addition to a dedicated individual to manage the program, experience in industry and the DoD indicates that a minimum level of effort is at least one full-time value engineer per one hundred (100) design or production personnel. Another reasonable index developed from the experience within DoD and contractor activities is to commit 0.1 percent to 0.5 percent of total annual dollar volume as an initial operating budget for VE. For procuring activities, one full-time value engineer for each 50 employees is reasonable. (These indices are guidelines and should not be considered inflexible requirements.) This ratio may vary considerably depending upon the degree of in-house specification analysis undertaken. The level of effort to be applied also varies with the nature of the VE organization, and the **type** of operation at the activity; i.e., the percent of design, development, and production; the type of product or services, etc. Also the need for dedicated people may be reduced if there are trained people in the organization who perform VE as an integral part of their job and can be made available for special intensive reviews.

Some organizations have applied a **novel** procedure for providing the funds necessary to sustain a VE program. The VE program is funded at an initial level which management deems a reasonable investment risk. As the

actual dollars saved become available, a portion of the savings is channeled into the VE program to replace expended funds. This accounting procedure permits a VE program to sustain itself on a portion of the actual savings that is achieved. The remainder is returned and utilized for other purposes. The process is somewhat similar to DoD operations supported by the stock fund concepts. This arrangement provides a continuing current assessment of the VE program and acts as a strong stimulus to encourage identifiable and verifiable results.

c. Rates of Return

The factors used to calculate rate of return will vary in accordance with the way the VE program is organized, and the manner in which indirect costs are allocated. Often, net savings to investment ratios of 15 to 1, or even higher, are shown. Many consider a reasonable return on the VE investment to be 10 to 1. But to be meaningful such claims must include an explanation of the investment base as well as the manner in which the productivity of the VE effort is measured. Productivity is a function of the savings resulting from implemented VE proposals. Productivity can be based on the savings for one, three, five, ten, or more years. Each possibility has its adherents.

Within the DoD, VE savings actions are reported in accordance with DoD Instruction 4245.8 which provides that monetary savings will be calculated for three years. The savings for all three years (separately identified for each year) are reported in the fiscal year that the action is accepted and implemented.

Similarly, the investment base is also subject to interpretation. For instance, a VE staff of four (a manager, two specialists, and a secretary) might incur direct payroll costs of \$125,000 per year. Some might consider this the total investment in VE. Others might wish to include such overhead costs as fringe benefits, taxes, travel, telephone, facilities, etc., which might add another \$50,000. Still others might wish to charge the VE program for the time and expenses of others on the VE program. For example, five managers meeting as a VE council for 1.5 hours a month might charge the VE program \$10,000 per year. Or, non-VE personnel supporting VE efforts might cost the VE program \$200 per day salary plus any other expenses incurred. Thus, a manager who includes all of the expenses necessary to operate a VE program, might consider a more conservative 5 to 1 net return on investment to be a more realistic goal.

As the program matures, it should be reviewed periodically and a "rate of return determined. Knowing the basis for the statistics regarding the program, a manager could then adjust the VE investment as necessary to maintain an adequate return. The experience of others and knowledge of the results achieved by other programs may be used as a guide to determine the initial investment and expected rate of return. But the results attained will determine a manager's subsequent investment decisions. If the investment cost is exceeding the savings or providing a poor rate of return, the program may be **overstaffed or for other** reasons not be functioning properly. In this case a manager may wish to make whatever adjustments are likely to yield a more productive VE program. On the other hand, an extremely high rate of return may indicate that an increase in investment in VE may provide even greater savings.

Organizing the VE Capability

A. Placement within the Organization

There is no preferred position within the organizational structure for the VE function. The mission of the parent activity greatly affects the type and location of the VE organization. Basic differences exist between development, acquisition, production, reprocurement, and maintenance activities. Some organizations may be devoted almost entirely to one of the above. But in most cases, there is a combination of activities with which to deal. The structure of the VE organization will vary to correlate with the functions and responsibilities of the activity of which it is a part. For example, a company specializing in research and development on advanced aerospace equipment generally will be heavily engineering oriented. In this instance, the principal focus for VE usually falls within the engineering department. On the other hand, a manufacturing company primarily engaged in the production of standardized military items which are procured in large quantities on a recurring basis tends to concentrate VE effort in the production department. Another company that subcontracts a great portion of the total dollar value of its contracts might well place primary emphasis on VE in the purchasing department. Some large companies, like the DoD, place operating VE elements in several activities such as engineering, purchasing, production, and marketing.

B. Categories of Responsibilities

It is usual practice to divide the VE responsibilities into two categories, the coordinating and the operating components. Coordinating tasks are those undertaken to assist those who perform actual VE efforts. Examples of coordinating tasks are overall program control, assignment of savings goals, allocation of resources, determination of priorities, measurement of progress, and development of VE policies and procedures. Operating tasks are those concerned with the direct support or actual performance of VE. Those assigned operating tasks conduct VE studies and generate and present VE proposals (VEPs). Also, they are usually assigned the responsibility for assuring that a VEP (or a VECp) is carried through to either implementation or rejection. (In some organizations, those performing coordinating tasks share this responsibility.)

The coordinating and operating elements may be vested in one group. This group can be subdivided, formally or informally, to satisfy both sets of duties. When the value studies constitute a variable workload supporting several projects or programs, a centralized VE organizational structure may be the most effective arrangement. Under this "pool" concept, the VE personnel are technically assigned to projects as required while administratively reporting to the central VE group. This type of organization would, for example, permit a single staff group to provide direct support for a number of program or project offices. As the value program matures and its scope expands, it may be desirable to separate the coordinating and operating elements. Also, the size of the parent activity will influence the number of levels and type of structure for the VE element. For example, in a small organization the VE component may be organized as a single element or even as one person, embodying both the coordinating and operating responsibilities. On the other hand, in a very large organization there may be a number of VE program managers with subordinates, all of whom perform only the coordinating tasks. In addition,

there may be a number of operating **VE** units in each of the major departments of each facility. Although both coordinating and operating tasks are vital for a successful program, the ratio of "doers" to coordinators should always be as large as possible.

Methods of Operation

The VE operating component can be organized any number of ways, depending upon the **size**, project **mix**, and structure of the parent organization. In practice, most of the patterns fall into three categories. These methods are not mutually exclusive. Many organizations use them in combinations. Some even use all three at the same activity. The three methods are:

A. Multi-Discipline Project Teams

Task force teams of specialists, including full-time value engineers, may be assigned to value engineer specific products. Normally team members represent many disciplines or occupational specialties such as design, production engineering, purchasing, industrial engineering, manufacturing, logistics management, user, etc. The complexity of the study subject and its cost determine the magnitude of the effort undertaken by the project team. The team may work on a full- or part-time basis. Teams have been established for as short a term as two weeks or for as long as six months. This method of organizing the operating component has the advantage of bringing together a number of diverse yet complementary talents which provide a multi-discipline approach to the problem. When the task is completed and the proposed remedies are accepted and implemented, the team is disbanded.

B. Project Value Engineers

Using this approach, a value engineer is assigned to a particular project and made responsible for a continuing VE effort from design through production. In this case, one or more value engineers technically competent in the assigned product area is assigned responsibility for ensuring optimum value in the product at every stage in its development. This method of organizing the **VE** effort has the advantage of providing VE continuity through all design and production decision points. The approach is most useful when projects are of sufficient economic promise to justify assigning value personnel on a full-time basis.

C. Procedural Review Points

With this method, a value engineer participates in all decisions at established review points such as design reviews, **make-or-buy** reviews, **systems** integration, drawing-release points, etc. The value engineer in this case is responsible for ensuring that value considerations are given proper weight at each decision point. This approach permits the VE staff **to** provide coverage for more projects. Although this procedure does not encourage intensive **VE** studies, in some cases it has been organized in a manner that would subsequently lead to such studies.

VE in the Project Management Office (PMO)

~~Two aspects must~~ be considered when establishing and operating a VE program in a PMO. They are managing the VE effort and performing the actual VE studies. Generally, VE studies must be accomplished at an appropriate level of responsibility (system versus detail) within the organization. If systems engineering is a part of the actual work of the PMO, then VE studies can be accomplished as part of the system-engineering effort. If the PMO is a separate organizational entity from its system-engineering element (as for example, in technical direction and system-engineering contracts), the PMO VE role may be primarily one of management. Managing VE in a PMO would include identifying areas for VE study, arranging for contract incentive clauses, and monitoring the results. It might also include arranging (and possibly managing) VE task forces staffed (or augmented) by personnel temporarily recruited from other sources.

There are inherent variations in the operation of project offices. To effectively manage VE, each PMO should establish VE objectives, develop a plan for achieving these objectives, and incorporate procedures for measuring progress toward the established objectives. The plan should take into account all the VE resources available to the PMO both contractual and organic. Figure IV-1 offers three different PMO VE program options. These programs differ primarily in the amount of manpower required. The basic objectives of each option are to reduce costs and meet any assigned VE savings goals without impairing essential performance. Slight variations of these options should fit most PMO situations.

Within the DoD, most of the procurement dollars are spent by the PMOS that manage major weapon systems. The DoD semi-annual reports, therefore, include statistics on VE accomplishments in each major program in order to emphasize their importance.

Motivational Considerations

A. Goal Setting

Announcement of an overall VE program savings goal is not likely to stimulate extensive participation in a VE program by subordinate organizations. Instead, each subordinate activity should accept responsibilities for a specific portion of the overall goal. Collectively, these sub-goals should add up to the total goal. This goal apportioning continues down through the entire organization. Achieving the VE savings goal should be the responsibility of the line organization, not the VE staff. In this way, savings become a line management responsibility. The entire organization becomes committed to achieving the savings targets. Each organizational component has a known specific target against which it can measure its own achievements. The VE goals assigned to an organization are expected to be "reasonable" in that the target is not set so high as to be unattainable, nor so low as to require little effort to meet it. However, the goals are intended to be attainable only by a concerted effort. This provides the impetus for each component to concentrate on projects promising the greatest dollar return per hour of VE effort. To assure a continuing motivation, previously announced targets should be given renewed emphasis periodically.

SOME PROGRAM MANAGEMENT OFFICE VE OPTIONS

<u>Options</u>	<u>Actions</u>	<u>Manpower</u>	<u>Comments</u>
Option I - Minimum Investment Program.	<ol style="list-style-type: none"> 1. Establish and operate VE reporting procedure. 2. Encourage contractors and subcontractors to submit VECs (letters by program manager) 3. Publicize and reward achievements. 	One person part time, if procurement and technical personnel are made responsible for encouraging contractors to submit VECs .	Program designed primarily for meeting VE program goals. Requires periodic management review of results obtained and periodic reminders to personnel to continue actions 1 and 2.
Option II - Medium Investment Program.	<p>Actions 1 thru 3, plus:</p> <ol style="list-style-type: none"> 4. Establish cost target program. 5. Establish procedures to identify areas for VE studies. 6. Assign VE study responsibilities during program reviews, and design reviews. 7. Visit contractors to review VE program progress and encourage VEC submissions. 	One person full time if assignment is primarily coordination tasks. If operating tasks are also included, manpower requirement would vary with size of system-engineering group (approx one per 50).	This option is intended to achieve VE through individual efforts as part of overall task. Requires training plan. Should reduce costs beyond goals. Management review of progress again required.
Option III - Maximum Investment Program.	<p>Actions 1 thru 7, plus:</p> <ol style="list-style-type: none"> 8. Conduct selected VE team or task force efforts on areas of high potential savings (in-house or joint Government/contractor efforts). 	<p>Per specific target. 2 to 5 people for 12 to 15 weeks. May be part time, no less than half-day meetings. Full-scale effort (complete analysis of system): 2 to 6 key PMO systems engineers supported by 10 to 30 additional people who could come from external source. Help to manage effort may also be available externally force may meet for up to two months.</p>	<p>More resources applied to high-dollar opportunities. VE opportunity emphasized for both management and operating personnel. Task forces also train, demonstrate benefits, and motivate personnel. Joint contractor Government efforts conserve Government manpower and demonstrate benefits of FAR VE clauses to industry and government personnel.</p>

Figure IV-1

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One method used to establish a goal is to compute the anticipated cost of the VE program and multiply it by ten. A second method is to assume an average level of cost reduction through VE on the entire product mix. Although the cost of the items studied may be reduced by 20 percent, 30 percent, or even more, the total cost of the entire mix is not likely to be reduced by this amount as an average. A very conservative across-the-board figure of 5 percent (or some other percent) of the total cost might be reasonable for a savings goal. Initial goals set on this basis may be subsequently revised as appropriate. Some commercial entities report that as much as 20 percent of their net profit after taxes results from their in-house VE program.

Within the DoD, a goal of 0.7 percent of the procurement TOA was set for the Contractor VECF program in 1979. Each Military Department is responsible for allocating this goal among its major purchasing activities. Each DoD Component reports its accomplishments versus the goal semi-annually. In addition to dollar goals, some DoD Components set annual goals for the number of VE actions. This serves as an additional stimulus to the VE program.

B. Recognizing Contributors

The purpose of the VE staff is to act as a catalyst for the overall VE savings program. Since VE savings goals are assigned to the line or program management organization, the dollar savings are credited to the element responsible for taking the action. Within the DoD, the element whose budget is affected by the savings action, (usually the element responsible for implementing the proposed change) is responsible for reporting the savings. The reported savings is then credited against the specific VE goal of the reporting element. Current DoD policy is to report all VE savings that result from VE actions taken by personnel of DoD Components or VE actions on existing defense contracts that require Government approval (VECPs).

Official recognition of contributors is vital to realizing the full potential of VE. A DoD manager needs to know which employees enhance the image of an agency spending the tax dollar wisely. An industry manager wants to know which employees are sufficiently competitive and profit-minded to apply VE resources and methodology most effectively.

The assignment of credit can be more subtle and complex than the direct measurement of VE savings. The system used by management to measure the results achieved by organizational elements participating in the VE program can be developed into a motivational force to encourage implementing VE proposals. For instance, one large aerospace contractor noted that its Government contracts' staff placed very little emphasis on presenting VECFs to its DoD customers despite the significant profit opportunity that they represented. A study of the problem revealed that the net effect on the marketing group of accepted and implemented VECFs was a reduction in contract sales achievements equivalent to the reduction negotiated in the contract price. To counteract this negative incentive, the Government contracts group is now credited with the sales equivalent to the savings reward earned for a VECF. For example, an accepted \$100,000 VECF (with a 50 percent sharing clause) used to result in the sales group losing credit for \$100,000 in sales. Now Government sales might be

credited with something like \$625,000 in sales based on an assumed 8 percent average gross income to sales. This procedure encourages the Government contracts group to strike a proper balance between its marketing efforts on new contracts and **VECPs** based on profit potential rather than impact on sales dollars.

The DoD has an **annual** honorary awards program for **VE**. The awards program is intended to acknowledge those individuals, program managers, organizations, contractors and **VE** specialists whose **VE** efforts were exemplary and resulted in substantial savings benefits during a particular fiscal year. Under this program, each DoD Component is encouraged to forward one nominee in each of five categories: DoD program manager, DoD field command or installation, **DoD** individual, DoD contractor, and **VE** professional. In addition, each DoD Component may also provide additional awards to its contractors or personnel who merit recognition for lesser but still significant achievements. For example, one DoD Component provides an award to contractors with approved **VECPs** of \$50,000 or more. Another recognizes individuals who reach savings of \$100,000 or more.

Program Control

Listed below are items of information normally included in a **VE** program control reporting system within a contractor or Government activity. Not all items would necessarily be reported to top management. Of those that do appear, many would be summarized rather than reported in detail.

- 0 Identification **of the** unit preparing the report.
- 0 Date the report was prepared.
- 0 Time period covered by the report.
- 0 Number of **VE** proposals approved and implemented during the reporting period, including net DoD savings anticipated.
- 0 Number of **VE** projects currently under study.
- 0 Number and dollar savings of **VE** proposals currently being evaluated.
- 0 Breakdown of "age" of proposals under evaluation, (i.e., 0 to 60 days, over 60 days).
- 0 Number of personnel spending more than half their time on **VE** work.
- 0 Total cost of **VE** program, last twelve months.
- 0 Ratio of savings to cost of program, last twelve months.

For DoD Components, semi-annual reports are required in accordance with DoD Directive 4245.8. Additionally each accepted **VE** action is to be entered into the appropriate **VE** data base. For supply and service contracts, a **DD Form 2333** is to be used to forward the information to the DoD **VEDISARS**. Construction actions are forwarded to the **VE-trieval** system.

Audit System

A. Program

There are two basic types of audit procedures. First, is the **VE** program audit, an on-site qualitative evaluation of the **VE** effort. Program audits can be internal (i.e., within the DoD or within contractor establishments) or a customer audit of supplier **VE** operations. Regardless of the type, the substance of the audit is the same. It includes an examination of the organization, staffing, procedures, and budgets of the **VE** elements throughout the organization. The audit team may also verify the validity of reported **VE** savings. In order to minimize the cost of the **VE** audit, it is generally integrated into previously established audit functions. The frequency of audits depends upon available manpower resources. Once a year is a reasonable goal, not always achieved in actual practice.

B. Savings Actions

A second type of audit procedure is used to validate each reported savings action against the established criteria. In the DoD, estimated savings are reviewed before Component semi-annual reports are submitted. Normally, all reported savings are both supported and validated from records and documentation existing within the reporting organization.

Current guidance for the in-house DoD **VE** program specifies a comprehensive audit of actions which save \$100,000 or over in any one of the three reporting years. Savings below \$100,000 a year are given desk reviews and occasionally a very limited field audit. The cognizant auditor for the reporting activity either validates each savings action or provides a signed statement setting forth the reasons for nonvalidation. Only validated savings are reported. When reporting officials do not concur with an audit nonvalidation and are unable to settle the dispute at the local level, a copy of the non-validated individual savings action; the auditor's statement; and a rebuttal to audit conclusions are forwarded through channels for review and final decision at a higher headquarters level.

Summary

Maintaining an effective **VE** program requires continuous monitoring and control. The initial investment in **VE** might be funded at 0.1 percent to 0.5 percent of the organization's budget (or sales for industry). Return on investment may range from a conservative 3 to 1 to a ratio of 10 to 1 or even higher. The results achieved will dictate the nature of the adjustments in the **VE** investment. The **VE** functions must be positioned in the organization in such a way as to be able to adequately perform both coordinating and operating functions. **VE** is generally accomplished in one of three ways: (1) multi-discipline project teams; (2) project-value engineers; and (3) procedural review points, or a combination of these. The **VE** capability in a Program Management Office must complement and provide direct support to those undertaking **value studies**, as well as coordinate in-house and contractor **VE** programs. **VE** goals will be influenced by differences in product mix, **VE** capability, size of the organization, etc. Broad targets, however, can often be set by (1) multiplying the cost of the **VE** effort by a target ratio, or

(2) taking a predetermined percent of the **total** product dollar volume. A reporting system measures progress toward the targets and provides a quantitative measurement of the program. A well-designed reporting system is **concise**, responsive, accurate, and timely. Summary reports are employed for higher level use. The concept of "reporting by exception" is utilized when appropriate. An audit system provides an on-site qualitative measurement of the **VE** program as well as verification of reported savings. The **VE** audit should be integrated with existing audit functions to minimize cost. Figure IV-2 provides a checklist useful to contractors in evaluating their **VE** program.

CONTRACTOR VE PROGRAM CHECKLIST

1. Do you set company or division goals for VECP income?
2. Are VECP goals established for line department and program managers?
3. Does top management review VECP income and approve VE operating goals and budgets.
4. Does company top management meet with key customer personnel to agree on VECP goals and processing on major contracts and programs?
5. Do personnel, such as marketing, work on the "team" and do they receive credit for VECPS approved, or are they "penalized" due to reduced credit for reduced contract price?
6. Do your negotiators understand VE clauses in the FAR? Do you request and negotiate for fair terms?
7. Do you place VE sharing provisions in your subcontracts? —
8. Is VECP income identified separately by accounting so that (1) Renegotiation Board review is eased, and (2) top management can recognize contribution of VE?
9. Do you assign resources to the development and marketing of specific VECPS?
10. Do you operate in a manner that allows you to minimize time to (1) develop a VECP and (2) obtain internal company approval prior to submittal to the Government?
11. Do you conduct formal VE workshops to expand your in-house capabilities and educate your' customer?
12. Do you exploit the benefits of using preliminary VECPS with your customer?

Figure IV-2